CAMERA INTERFACE BOARD

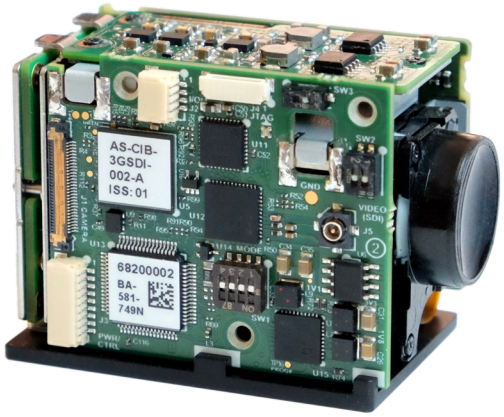
For Tamron and Sony Block Cameras

Active Silicon
COMPUTER IMAGING PRODUCTS

- **3G-SDI interface board for Tamron MP1x10 series and Sony EV series**
- **1080p/1080i/720p high definition video output**
- **Analog composite output (PAL/NTSC/RS-170)**
- **HD-VLC™ mode for long cable length applications**

FEATURES

- 3G-SDI interface solution for the Tamron MP1110M-VC and MP1010M-VC cameras.
- 3G-SDI interface solution for the Sony EV series.
- Simultaneous analog (PAL/NTSC) when in 720p50/59.94/60 modes.
- HD-VLC™ mode for long cable length applications.
- 75 Ohm micro-coax connector.
- Supports all HD modes up to 1080p60.
- Compliant with SMPTE 274M and SMPTE 296M.
- Video mode selection switches and built-in test pattern.
- TTL serial UART comms port for camera control (3.3V).
- Selectable RS-232 / RS-485 for camera communications.
- RoHS compliant.



OVERVIEW

This interface solution from Active Silicon's **Harrier** series of camera interface boards provides real-time low-latency 3G-SDI output for the Tamron MP1110M-VC and MP1010M-VC camera, as well as other autofocus-zoom camera brands like the Sony range. In addition, the interface board can provide simultaneous analog output in Standard Definition (SD) when the camera is operating in 720p50/59.94/60 modes, along with options for cropping or scaling for 16:9 displays.

A DIP switch located on the board allows the video mode to be set (read on power up). The video modes along with other interface board specific modes may also be controlled by serial communications. RS-232, RS-485, and TTL interfaces are supported.

There is a built-in test pattern which conforms to the SMPTE RP-219-2002 specification (see Figure 2).

HD Visually Lossless Compression (HD-VLC™) is a technique for compressing HD image data into a lower data rate SDI stream. This mode can be selected via the DIP switch or via serial commands. This allows much greater cable length (three to four times the distance), plus a greater ability to pass through multiple sliprings. A decoder is needed at the other end of the cable to convert back to HD-SDI (Active Silicon's "Harrier SDI Adapter").

There are OEM options (via custom firmware) for meta-data to be inserted into the video stream.

In applications where space is at a premium, the interface board may be fitted onto the side of the camera by removing the bracket as shown below in Figure 1. Active Silicon can provide a special base bracket for this purpose (see Ordering Information for part number).

Alternatively, OEMs may design their own mounting solution making use of three M2 counter-sunk holes in the interface board (see Figure 3).

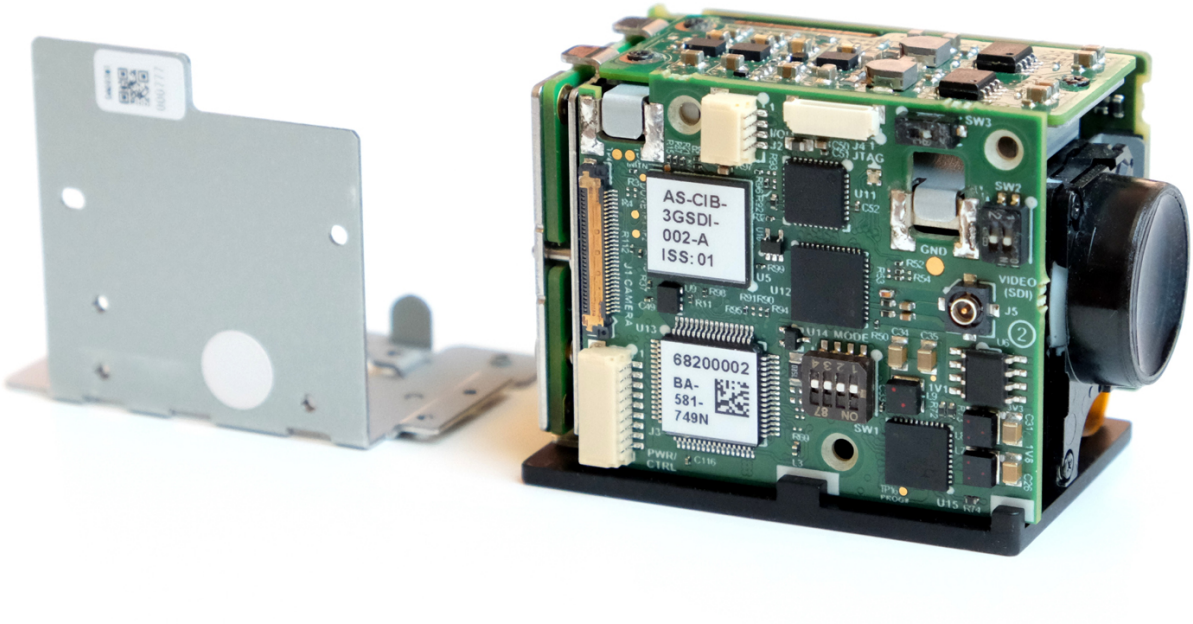


Figure 1: Tamron camera with interface board fitted (replaces side/base bracket).

Test Pattern

The following test pattern may be selected by (a) driving pin 1 of connector J2 low, or (b) selecting via serial communications.

Figure 2: SMPTE RP-219-2002 test pattern available from the interface board.

CONNECTOR SPECIFICATION

KEL30 Connector ("Camera") (J1)

The interface board is fitted with a 30-way miniature connector to link to the matching connector on the camera.

Connector type: KEL USL00-30L.

Mating cable: KEL USL20-30SS-010-C (100mm length) or KEL USL20-30SS-005-C (50mm length) micro-coax cable. This cable can be supplied as part of an OEM kit (see Ordering Information). Other lengths also available subject to minimum order quantities.

Input/Output Connector ("I/O"): 4-way (J2)

The interface board is fitted with an industry standard 4-way connector for test pattern and reset control, plus VSync out.

Connector type: JST SM04B-SRSS-TB

Mating cable: Suitable cable is supplied with the interface board.

PIN	SIGNAL	LEVEL	NOTES
1	PGEN#	TTL compatible 5V tolerant. Active low signalling.	Input pin with 10kΩ pullup resistor. Drive low to enable the SMPTE test pattern.
2	SYNC OUT	TTL (3.3V CMOS compatible with 5V TTL)	VSync active high by default. Alternate configurations selectable by software.
3	GND	0V	GND
4	RESET#	TTL compatible 5V tolerant. Active low signalling.	Input pin with 10kΩ pullup resistor. Drive low to reset the camera and interface board.

Note: The RESET# input, after some signal conditioning to remove any noise, is also fed into the camera, so a reset from this input will reset both the camera and the interface board.

Power and Control Connector ("PWR/CTRL"): 9-way (J3)

The interface board is fitted with an industry standard 9-way connector for power, serial control and analog video out.

Connector type: JST SM09B-SRSS-TB

Mating cable: Example mating cable supplied with the Evaluation Kit.

PIN	SIGNAL	LEVEL	NOTES
1	RS-232 Rx / RS-485 B	EIA/TIA-562 or EIA/TIA-485-B	Selectable VISCA control by DIP switch. See SW2 description.
2	RS-232 Tx / RS-485 A	EIA/TIA-562 or EIA/TIA-485-A	Selectable VISCA control by DIP switch. See SW2 description.
3	Analog SD video out	PAL / NTSC / RS-170 signal levels	PAL in 720p50, NTSC in 720p59.94/60.
4	Analog video GND	0V	Video GND
5	Power GND	0V	GND
6	DC Power In	8.25V to 12.25V	Power supply, nominal 9V
7	VISCA GND	0V	GND for VISCA Comms
8	RxD#	TTL compatible input 5V tolerant. Active low.	Selectable VISCA control by DIP switch. See SW2 description.
9	TxD#	TTL output. (3.3V CMOS compatible with 5V TTL)	Selectable VISCA control by DIP switch. See SW2 description.

Analog Video Out (Pin 3, J3)

Standard resolution composite analog is simultaneously available in HD modes 720p50 (for PAL) and 720p60/59.94 (for NTSC). There are two options for the analog output, selectable via serial control:

(a) the 1280 pixel wide HD image can be cropped to 960 wide by cropping a 120 pixel strip off each side to make a 4:3 aspect ratio Standard Definition (SD) signal, or alternatively.

(b) by pre-warping the image, such that when displayed on a HD monitor in the monitor's stretch-to-fit mode, the original full-width HD signal will be displayed correctly at 16:9 aspect ratio. Both methods ensure the displayed pixels remain square and that the image is not distorted.

JTAG Connector (J4)

Test connector used in manufacturing for circuit verification.

3G-SDI Output Connector ("Video (SDI)") (J5)

The interface board is fitted with a Hirose H.FL Micro Coaxial Connector (75 Ohm).

Connector type: Hirose Micro Coaxial Connector (Receptacle), part number H.FL-R-SMT(01).

Mating Connector: Use mating cable with 75 Ohm characteristic impedance, for example Hirose part number H.FL75-2LP-084H-A-100.

Video and Control Mode DIP Switch (SW1)

The interface board is fitted with a 4-way DIP switch to select various video output and control modes.

SW1-4	SW1-3	SW1-2	SW1-1	Video Format
OFF	OFF	OFF	OFF	External (VISCA) controlled
OFF	OFF	OFF	ON	1080p60
OFF	OFF	ON	OFF	1080p59.94
OFF	OFF	ON	ON	1080p50
OFF	ON	OFF	OFF	1080p30
OFF	ON	OFF	ON	1080p29
OFF	ON	ON	OFF	1080p25
OFF	ON	ON	ON	1080i60
ON	OFF	OFF	OFF	1080i59.94
ON	OFF	OFF	ON	1080i50
ON	OFF	ON	OFF	720p60
ON	OFF	ON	ON	720p59.94
ON	ON	OFF	OFF	720p50
ON	ON	OFF	ON	720p30
ON	ON	ON	OFF	720p29
ON	ON	ON	ON	720p25

Notes:

1) "External (VISCA) controlled": The Video Format is changed by VISCA serial commands, followed by a Reset (there is also the Camera Hard Reset in extended VISCA commands which will also serve this purpose).

2) **The DIP switches to select the Video Format are read on power-up only.** Therefore, to change mode using the DIP switches, power down the camera, set the switches and then power up the camera. DIP switches will only be effective for the operating modes supported by the camera currently in use.

Communications Mode Selection (SW2)

The interface board is fitted with a 2-way DIP switch to select the serial communications standard.

SW2-2	SW2-1	Video Format
OFF	OFF	RS-232 VISCA communications on J3 pins 1 and 2.
OFF	ON	RS-485 VISCA communications with RS-485 termination enabled on J3 pins 1 and 2.
ON	OFF	RS-485 VISCA communications with RS-485 termination disabled on J3 pins 1 and 2.
ON	ON	TTL VISCA communications on J3 pins 8 and 9. Transceiver connected to J3 pins 1 and 2 will be shut down. Applications using this configuration should leave J3 pins 1 and 2 unconnected.

Digital Transmission Standard Selection (SW3)

The interface board is fitted with a 1-way DIP switch to select the SMPTE or HD-VLC digital output standards.

SW3	Function
OFF	SMPTE compliant output.
ON	HD-VLC compressed output.

Status LED ("LED1")

The interface board is fitted with multi-color LED to indicate camera status.

Solid Green: Camera and interface board are powered and working correctly.

Solid Red: The interface board is powered but there is a fault/problem – e.g. no video data is being received; internal power supply voltages outside specification; internal semiconductor junction temperature is over recommended limit.

Serial Control Commands

The camera may be controlled by the serial VISCA commands. This serial signal is routed through the interface board and on to the camera. However, this serial signal is also connected to the internal processor on the interface board and extended VISCA commands (ones that are not used by the camera) may be used to control the interface board in addition to the camera.

For camera operation using VISCA serial commands, refer to the camera's user manual.

For interface board operation using VISCA serial commands, refer to the Technical Note from Active Silicon on "Extended VISCA Commands".

CONFORMANCE

3G-SDI:	Compliant with SMPTE 274M and SMPTE 296M.	
Approvals:	To meet EMC and FCC requirements the interface board has been designed to meet these requirements when housed in a suitable enclosure:	
	CE	Compliant with the relevant EU directives as listed below.
	RoHS	Conforms to RoHS3, the European Union's Restriction on Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment Directive 2015/863/EU.
	EMC	Compliant with EN 55022:2010 (class A) and EN 55024:2010 in accordance with EU Directive 2014/30/EU Electromagnetic Compatibility.
	REACH	Compliant with the requirements of REACH (Registration, Evaluation, Authorization and Restriction of Chemicals, EC 1907/2006), the European Union's chemical substances regulatory framework for Substances of Very High Concern.
	UL	All printed circuit boards used in this product are manufactured by UL recognized manufacturers and have a flammability rating of 94-V0.
	FCC	Compliant with FCC Rules for Class A digital devices.

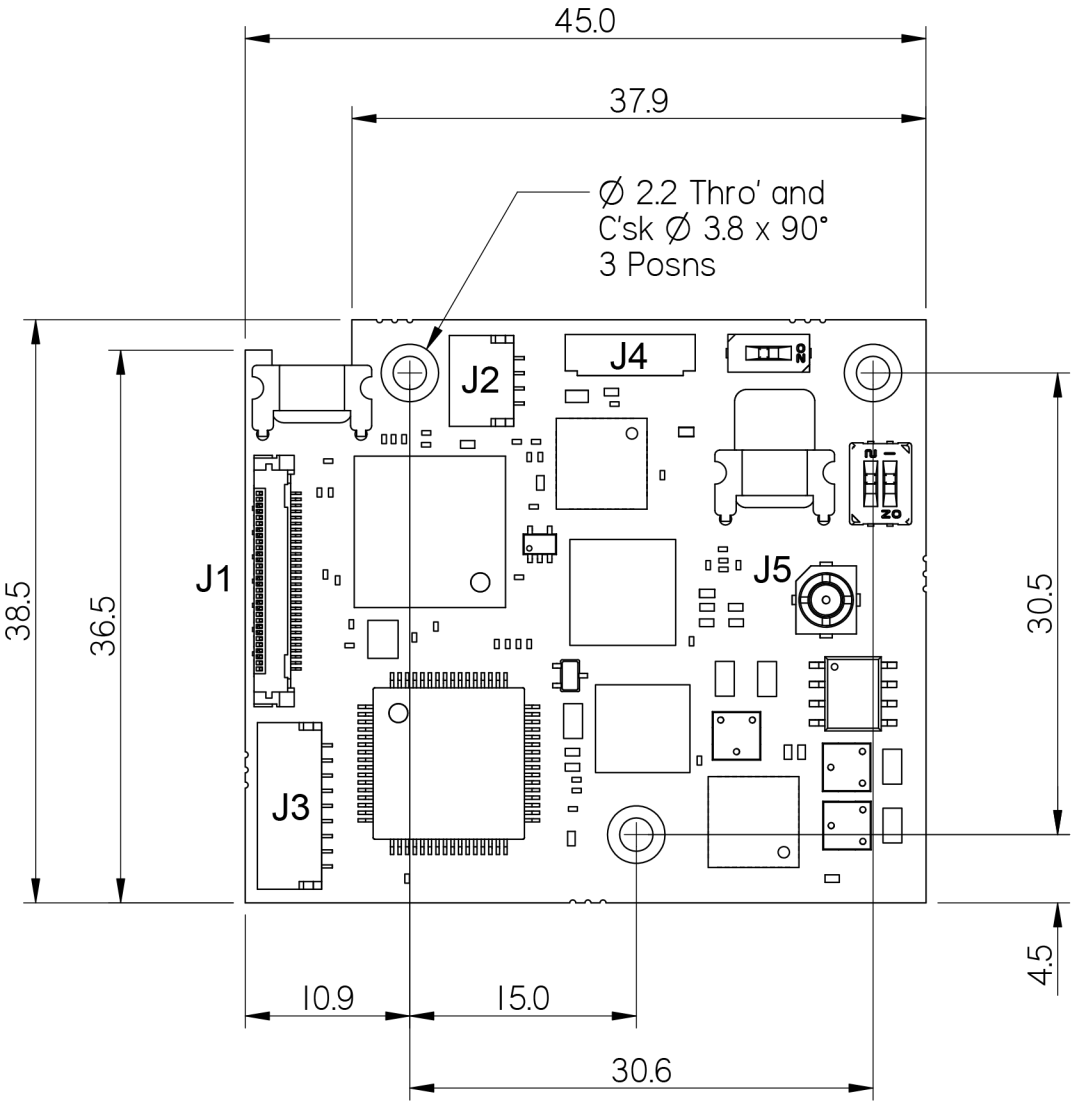


Figure 3: Mechanical overview (all dimensions in mm).

PHYSICAL AND ENVIRONMENTAL DETAILS

Dimensions:	45mm by 38.5mm.
Weight:	8g (interface board only, no cables). The Tamron MP1010M-VC / MP1110M-VC camera weighs 77g.
Power Supply:	8.25V to 12.25V
Power Consumption:	The Tamron MP1110M-VC camera and interface board combined typically draw 400-500mA @ 9V depending on the camera mode used.
Storage Temperature:	-20°C to +70°C.
Operating Temperature:	-5°C to +60°C (ambient environment).
Relative Humidity:	10% to 90% non-condensing (operating and storage).

ORDERING INFORMATION

PART NUMBER	***DESCRIPTION***
AS-CIB-3GSDI-002-A	3D-SDI output, interface board for the Tamron MP1110M-VC and MP1010M-VC. Analog composite output (when in 720p50/59.94/60 operating modes). Support for HD-VLC compression technology. Board only, no cables included.
AS-CIB-3GSDI-002-1010-A	***AS-CIB-3GSDI-002-A*** supplied fitted to Tamron MP1010M-VC with ***AS-CIB-USL30-100MM*** connecting cable fitted.
AS-CIB-3GSDI-002-1110-A	***AS-CIB-3GSDI-002-A*** supplied fitted to Tamron MP1110M-VC with ***AS-CIB-USL30-100MM*** connecting cable fitted.
AS-CIB-3GSDI-002-EVAL-A	Evaluation Kit for ***AS-CIB-3GSDI-002-A*** interface board. Includes power supply, cabling and PC serial interface (via USB).
AS-CIB-USL30-100MM	30-way micro-coax cable for connecting between the interface board (J1) and the camera. Length 100mm. (Manufacturer: KEL, part number: USL20-30SS-010-C)
AS-CIB-USL30-50MM	30-way micro-coax cable for connecting between the interface board (J1) and the camera. Length 50mm. (Manufacturer: KEL, part number: USL20-30SS-005-C)
AS-CIB-CBLKIT-002-A	Cable kit for ***AS-CIB-3GSDI-002-A*** containing H.FL/BNC cable and bare-end control cables for J2 and J3.
AS-CIB-BRK-001-A	Bracket Type 1, to fit the interface board ***AS-CIB-3GSDI-002-A*** to the side of a Tamron MP1x10M-VC camera after removing the original base bracket.

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CONTACT DETAILS

Europe:

Active Silicon Ltd
Pinewood Mews, Bond Close, Iver,
Bucks, SL0 0NA, UK.

Tel: +44 (0)1753 650600
Fax: +44 (0)1753 651661
Email info@activesilicon.com
Website: www.activesilicon.com

USA:

Active Silicon, Inc.
479 Jumpers Hole Road, Suite 301,
Severna Park, MD 21146, USA.

Tel: +1 410-696-7642
Fax: +1 410-696-7643
Email: info@activesilicon.com
Website: www.activesilicon.com

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